



COLORADO SPRINGS,
COLORADO

SEPTEMBER 1990



PIKES PEAK RADIO AMATEUR ASSOCIATION, INC.
P.O. Box 16521
Colorado Springs, CO 80935

FIRST CLASS MAIL



Ø BEAT



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* denotes the first year of a two-year term.

ZERO BEAT is published monthly in the interest of the members of the Pikes Peak Radio Amateur Association, Inc., P.O. Box 16521, Colorado Springs, Colorado 80935. Cost is 50¢ per month for non-members or a \$6.00 per year subscription. Permission is given to reprint articles or excerpts provided credit is given. Deadline for submission of articles is the 21st of the month. Classifieds accepted anytime.

The Pikes Peak Radio Amateur Association meets on the second Wednesday of each month at 7:00 p.m. All amateurs and interested parties are invited to attend.

EDITOR: Ron Deutsch NKØP 4305 Ridgeline Drive Colorado Springs, Co. 80918 (719) 593-8352 or 145.01 (Packet)

MESSAGE FROM THE PRESIDENT...

Each month for almost a year I have put together a short column for each newsletter and driven over to Ron's house (usually at the last minute) to deliver it just in time for publication. This month may be the last, however, as Ron will be out of town for the October issue. Putting together a quality newsletter like ØBEAT is no small feat. Ron has tried to find good articles, written by local hams, about a great hobby. We have been fortunate in having had several good editors over the last 5 years. Sooner or later, each has asked to be replaced. Ron is looking for a new editor to take his place and continue publishing ØBEAT. Anyone who is willing to collect, edit and publish the articles in ØBEAT for the next year or so should contact Ron.

Another member of our club, Al, NØCMW, has helped out with a great number of jobs over the last 7 years. I'm sorry to say he has offered his resignation from office and the board of directors, effective with the October club meeting. His efforts in support of the club will be missed and I hope you will all join me in thanking him.

Everybody has favorite amateur radio activities. One of mine is the Teller County Auto Hill Climb. Plans for a fall hill climb have been resurrected and on 8 September the cars will again run on Four Mile Road. Hopefully you can take the time to come out and watch this fun event. It is just one of the many

events our club takes on each year in the interest of public service. Those of you who have helped out in one way or another with these events have helped to build up the reputation of our club and amateur radio.

One last reminder, next month we will be electing new club officers. I hope for a large turnout for the business meeting and elections so the club can get the best possible officers for the coming year.

73's Rick, WB7THT.

CW ELECTRONICS HAM STORE CLOSED

BY THE TIME YOU READ THIS THE HAM RADIO DEPARTMENT OF CW ELECTRONICS WILL HAVE CLOSED ITS DOORS. I WOULD LIKE TO THANK PUBLICLY ALL OF YOU WHO SUPPORTED THE STORE HERE IN COLORADO SPRINGS. BOTH THE COLORADO SPRINGS AND THE DENVER STORE WILL CONTINUE TO OFFER COMPUTERS AND ELECTRONIC PARTS.

73s and thanks...Al NØCMW

"THE VIEW FROM THE PEAK"

by George Hinds

N8CIX "WE COULDN'T HAVE MADE IT WITHOUT YOU!"

Sweet words indeed -- to a group of Front Range ham radio operators who had put in many hours serving the National Multiple Sclerosis Society over the weekend of July 7 & 8. Sweeter yet -- because it's no secret that so often hams get little, if any, recognition and appreciation for the communications services they provide without cost to charitable, research and public service agencies. Speaking those kind words were official representatives of the Society at a special breakfast for those hams who donated their time, talent and equipment to the "Go For The Gorge" Bike TOUR, a 150-mile ride that took place in early July to benefit the Multiple Sclerosis Colorado Chapter in their efforts to support research seeking to find the cause and cure for this disease. The route began just south of Denver at Highlands Ranch and traveled down the Front Range through Colorado Springs. After an overnight stop, it proceeded on south and then west to the Royal Gorge. Distance traveled: 150 miles!

The number of riders entered in this event? How about 3,450! Acclaimed by the bikers themselves as the best ride of its kind in the nation, too. The logistics of organization were staggering: for example, having a complete lunch available to all 4,000+ riders and volunteers was a monumental task. To top that off, a spaghetti supper was served Saturday night to the group! For those who manned the net control positions, they enjoyed the loan from the El Paso County Search and Rescue team of their super-equipped mobile communications van!

For those who were at the August club meeting, you saw that model of what every club would relish for the same purposes. From the amateur radio standpoint, it required seven (7) repeaters to cover the territory and service the various groups involved: medical, tactical communicators, "sag" wagons, supervisors, and such. Amateurs from areas like Denver, Colorado Springs, Pueblo and Canon City participated over the miles involved. Perhaps one reason it's so well organized: a 66-page training manual is issued to all leaders of the various units involved! Next year a different route will be followed; hopefully you, too, will be there to lend your expertise and equipment! They'll be counting on ham support ~~next year~~.

As for me, I ended up with sunburn in places that hadn't been sunburned in years; with ankles that felt like they were ready to fold over after almost nine hours of standing at a major traffic intersection; with, best of all: a feeling of satisfaction that all went safely and well as Front Range hams and ham radio systems provided effective, reliable communications like no other group could have. It gave us the chance to work

alongside amateurs from other areas and other groups, all with the same objective of service to a worthy cause. From the conversation at the celebratory breakfast get-together, most others felt the same. This is not just a "hobby" -- This is the Amateur Radio Service. "OBEAT" is read...

Those contributing an article may wonder if it was read. To prove someone does read what appears, comes a letter to me from PPRAA member Jim Clark, KB0FIR, formerly of Colorado Springs and now in Florida. Jim's letter makes some observations that you'll find interesting. I expressed my personal opinions about Florida last month so Jim's deserve airing. (We'll call it "The View From Florida"): Dear George: (dated August 14, 1990) "I moved to the Tampa, Florida area from Colorado Springs 3 months ago, therefore I still get OBEAT forwarded to me at my new QTH. You probably wonder why I'm writing? Your comments in OBEAT (some were funny) on Florida, of course. I spent 3 years in Colorado Springs, and 5 and 1/2 years in Denver. Yes, I loved Colorado. No, I don't miss it that much, not yet. "I'll tell you why I like it here. Better pay. Same low cost of living. Ocean. Beaches. Cultural diversity. And very friendly people. Sure, it gets hot here. But we do go outside in the summer. I've played golf in the middle of the day. And mowed the yard, too. I remember Colorado winters, not too fondly, I might add. "And, this is a great place for hams. In Colorado Springs, I couldn't put up a decent antenna in a subdivision because of all the restrictions. As soon as I moved into a rented house in a subdivision here, up went my new 31-foot vertical in full view of the neighbors. Florida is well known for very few restrictions on antennas and "external structures". You see towers even in some of the most expensive neighborhoods. "Propagation into Europe and Africa is a real difference. In two months of operating, I've worked over 30 new DXCC countries with 100 watts to my vertical. I'm saving for a house here; then I can out up a tower and beam.

"You spoke in your column about the "whiners". While they exist everywhere, you sure hear a lot more positive talk down here. Maybe the better economy is part of the reason? Or is it the lifestyle? Colorado is beautiful and a wonderful place to live. But I moved to Florida for opportunity and lifestyle. I knew Colorado Springs well; I was the Executive Director of the Convention and Visitors Bureau. I now have the same position in Tampa. Both communities are good. "Did you ever wonder why people who live in Colorado brag about it? The land of snow, unemployment, people who complain about taxes, spend all their time going from a heated car to a heated house,... is anyone a native of that place?" (See you at the Super BowlXV -- guess where?) 73, Jim KB0FIR/4."

73, George N8CIX

Pikes Peak Region - Frequency Listing of Services

Aug.08,1990

Page 1

REC.#	A	Agency Name	Output F	Notes
23	A	Buena Vista	146.745-	Mt. Princeton
44	A	Canon City	?	220MHz repeater
22	A	Canon City GARC	147.21+	
36	A	Castle Rock Rptr Grp	146.67-	
12	A	COS	147.03+	PL - linked to 449.90 PL WA00X0
31	A	COS	147.105+	
7	A	COS	147.135+	link to UHF 448.30 rptr
32	A	COS	147.18+	
33	A	COS	147.27+	
41	A	COS	224.82-	to be re-located to Cheyenne Mountain
10	A	COS	448.25	PL
11	A	COS	448.60	Can be linked to 29.6 remote base
6	A	COS Black Forest	147.39+	PL - WB0TIB rptr
5	A	COS Pikes Peak FMA	146.76-	Low-profile account .76 rptr in Boulder
1	A	COS Pikes Peak FMA	146.97-	Hi-profile repeater w/a.p. (members)
8	A	COS Chey Mtn Rpt Grp	147.345+	autopatch - members
9	A	COS Chey Mtn Rptr Grp	447.825	PL 141.3 - El Paso Co. and east
4	A	COS Pikes Peak FMA	448.450	wide-area; linked to Lamar 146.61-
21	A	Cripple Creek	145.46-	Teller Co. s&w of Hwy 67 tunnel
15	A	DNR	145.28-	
20	A	DNR	145.355-	Link: Salida Rifle Leadville COS Cheyenne
19	A	DNR	146.88-	Denver Radio League
34	A	DNR Aurora Rpt Assoc	147.15-	
35	A	DNR Aurora Rpt Assoc	447.15	
17	A	DNR Co Rptr Assoc	145.145-	
18	A	DNR Colo Rptr Assoc	147.225+	Conifer Mtn
2	A	DNR Conifer Mtn	?	220MHz Repeater
16	A	DNR Rky Mtn RL	145.43-	
13	A	DNR Rky Mtn RL	146.94-	wide-area rptr - Squaw Mtn
14	A	Leadville	145.445-	Linked to Grd Jct, Dnr, Salida
30	A	National Simplex	146.4 & 47	15kHz 146.415/146.595 & 147.42/147.585
29	A	National Simplex	146.52	Metro areas: calling & short contacts
40	A	National Simplex	220 MHz	20kHz spacing 223.42 to 223.90
39	A	National Simplex	223.50	
38	A	National Simplex	445-447	Shared: simplex, auxiliary, links, etc.
37	A	National Simplex	446.00	
25	A	Pueblo Ham Club	146.79-	
24	A	Pueblo Ham Club	146.88-	
43	A	Pueblo Methodist Mtn	?	220MHz Repeater
26	A	Salida Monarch Pass	147.285+	Colo Connection link to Ldvile, DNR, etc
28	A	Vail	146.61-	
27	A	Walsenburg	146.73-	
2	A	Woodland Park MARC	145.16-	At 9200' 4mi. n.w. of Woodland Park
3	A	Woodland Park MARC	448.650	P.O. Box 1012, Woodland Park, CO 80866
91	B	COS Pikes Peak H C A	464.55	PPHCA Race Officials
76	B	COS Woodland Park	35.02	McDonald's Drive-in Service Freq.
61	B	Cripple Creek	154.54	Cripple Creek Communications (Service)
98	B	Wld Pk School Bus	463.755	Has rptr/talk-around channels on 463.755
60	B	Woodland Park AAA	154.515	Fred's Towing
92	F	Cascade	154.43	
83	F	COS Fire Dept	460.525	#2 Channel
82	F	COS Fire Dept	460.625	#1 Channel
52	F	Divide FD	155.985	
93	F	Green Mountain Falls	154.43	
85	F	Manitou Springs FD	155.10	
54	F	Teller Co FDe	154.28	To be installed county-wide
53	F	Woodland Park FD	155.04	Also use 154.965 at fire locations
97	L	Canon City Prison	155.835	
86	L	Colo Dept of Wildlife	151.175	Also 151 .19 .145 .22 .128 .34 .37
71	L	COS NOAA Weather	162.475	
67	L	COS Pikes Peak Hwy	453.900	Patrol and maintenance on Pikes Peak
72	L	DNR NOAA Weather	162.55	
102	L	Emergency Preparedns	154.13	Being implemented - FD, PD, S&R, CD, etc
70	L	Florissant Fossil Bd	167.025	

(A) Amateur (B) Business (F) Fire (L) Government (P) Police
(R) Railroad (S) Special Emergency

1934 Official

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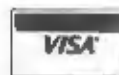
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ARES DISTRICT 14

(EL PASO & TELLER COUNTIES)

SEPT. 1990

Dist. 14 Emergency Coordinator, Mike Stansberry, K0TER, 636-1290, 590-2317

AEC; El Paso Co. John Chapman, N0KIC, 635-1604, 590-2317

AEC; Teller Co. Bud Thompson, N0AA, 689-2983 (Cripple Creek)

AEC; Severe Wx. Doug Paris, N4TGO, 495-4908 (Black Forest)

Alt. Sev. Wx. Steve WB0VHR, 570-1070 540-0990

AEC; Packet, Jeff N0JLH, 591-6438

MISSION:

To coordinate and provide communications via Amateur Radio for public safety and welfare primarily in El Paso and Teller Counties. The success of the above mission depends heavily on:

1. A large base of operators who are willing to lend their time, experience and equipment for public service. Non-emergency public service events are one way of gaining experience and checking equipment out under near-actual conditions.

2. Having local government authority awareness of our availability and capabilities.

We have over 60 amateurs that have filled out registration forms. The info on these forms tells us what experience, training and equipment they have. What it doesn't tell us is who might help us do some of the day-to-day behind-the-scenes work.

We have been working with Frank Luciani (KA0ZGR), manager of El Paso County Disaster Services. The county Emergency Operations Center (EOC) located below the police station (230 E Kiowa) has vhf/uhf, packet and hf (needs better ant.) capability. Frank has invited all who wish down to see and use his equipment. (Please call ahead, 632-1180) Frank is also responsible for coordinating medical disaster exercises. On Sept. 23rd we will help with one. In this exercise we will help with coordination & evaluation. Will need 6 (12 ok) operators and should be finished by 9 AM.

There is (or will be) 2mtr antennas on all hospitals from the Air Academy to Fort Carson. Any amateur with an HT and PL259 to BNC pigtail should be able hook to the connector (located in the emergency room area) and communicate to other hospitals and other medical units.

There is also 2mtr antennas located on Red Cross, County Health and Ambulance Dispatch buildings. Being familiar with any of these ~~antenna connections~~ would be a real 'PLUS' if a large disaster should occur. The connector at FT. Carson hospital is located in 'comm-center' and ant. does NOT hit 37/97 very well.

The antenna at Penrose Main needs repair. Bud (N0AA) is in the process of checking and documenting all this. *(Penrose antenna has now been repaired, Editor)*

For best communications in any situation (real or practice) an operator must remember to:

A. BE BRIEF and CONCISE but not cryptic. Plan your transmission. Getting it right the first time means less repeats, thus saving valuable air-time and battery. You could need that battery later.

B. PLEASE LISTEN; When working in a net, DO NOT QSY or turn down your receive volume without permission of 'net control'. How many times we've heard "sorry I had my volume down". Listening to the rest of the net, even when at the moment none of the transmissions are directed at you, can be beneficial. If and when the action shifts to your area you will be ready.

C. BRING PEN & PAPER; When operating in a public service situation, being able to keep notes, is a real asset. Writing pertinent info down when you first hear it, saves asking for that info again. When taking messages from a public or event official, hand him/her your note pad and have them write the message. It may be a few minutes before you can get in to the net and the official can go about his business. This also prevents a lot of mistakes.

Medical Disaster Antenna Locations

Air Force Academy Hospital Now remodeling, ant. temp down.

Penrose (Main) Emergency room 2216 N. Tejon, Ant. connector is on corner pillar near registration desk.

Penrose Community 3205 N. Academy Emergency Room Ant Connector is near registration desk.

Memorial 1400 E. Boulder Ant lead is coiled up near the Emergency Room registration desk.

St. Francis 825 E. Pikes Peak Ave. ant. conn. is in Pathologists Office near Emergency Room. (See Security) This should change soon.

Ft. Carson Hospital Ant. connector is on N. wall of Med-comm. room across aisle from emer. room desk.

Central Amb. Dispatch (A-1 Paramedics) blue/gray 2 story building 1820 E. Platte Drive around back & go upstairs to Room 224

El Paso Co. Health 501 N. Foote (N. of Mem. Hosp.) Ant. connector is in center of N. wall of conference room.

Red Cross 1600 N. Cascade 2nd floor, Ant. lead hangs near window in small front office.

Central Fire Station 801 Prospect Lake Dr. (enter around corner on Las Animas St.) *No antenna installed at this time.

This is the location of Colo. Springs Disaster Control Center. Many of the antennas listed above were furnished by the PPRAA. A more complete description of how to find these antenna leads and connectors is being compiled by Bud (N0AA) and will be sent along with other information direct to ARES members in Dist. 14.

The Pikes Peak Red Cross has asked us to try to establish and maintain contact with any amateurs that live in the counties east of this one. They are mostly interested in Elbert, Lincoln, Kit Carson, and Cheyenne counties. They are concerned about reliable communications in the future should another disaster happen.

Any one with information, concerns or questions please contact one of us by landline or please check in to one of the ARES Nets.

DIST. 14 NET 7 PM (local time) TUESDAY
146.37/97 PFFMA rpt

EAST. SLOPE 8:30AM (localtime) SUNDAY
146.34/94 DEN area

COLO. ARES 8 AM (local time) SUNDAY
3.928 mhz 75 meters

PACKET-BBS Colo. Sprs. @WB0YNS 145.01
also has ARES files

LL-BBS 390-5318 (Lee WB0BLV will xfer from/to packet)

73 See you on the nets

John N0KIC

ANNUAL PICNIC

On August 5th, The PPRAA held its annual picnic in conjunction with the Pikes Peak FM Association. The picnic started around 12 noon and cooking was soon underway. Several people brought along items to sell at the tailgate mini swap-fest.

The PPRAA raffle for an Astron 35A power supply was won by Jeff, N0JLH. An estimated total of about 80 people from Colorado Springs and surrounding communities enjoyed the picnic which started to wind down around 2pm.

Many thanks to Russ, KB0FNM, Rosie, WA0MNL, Harv, WB6YXD, for their cooking expertise and to all others who helped make the picnic a success.

Dave N0ION

BIKE-A-THON

Under perfect weather conditions "Blazing Saddles" got underway Saturday August 18th. This was the annual Bike-a-thon for the Pikes Peak Foundation for Mental Health. Cyclists could choose the 15 or 50 mile loop; starting and finishing at Sky Scr stadium with a tailgate party and baseball game.

A group of enthusiastic Ham operators volunteered their services for communications. The repeater of WB0TTB, Bud was used and Bud stood by to help. WA7VVA, Donald; KA2KER, Sid assisted on the 50 mile course and KB9S, Malcolm and KB0FNM, Russ did the same on the 15 mile route. WA0MNL, Rosie was base station at the stadium. Our help was greatly appreciated and an invitation extended for next year.

You do good work, folks!

WA0MNL, Rosie

The Ham community is to be commended for the super communication job they did...especially when more than one event occurs at the same time. Such as the weekend of August 17, 18, 19; when there was the 3-day rocket launches west of Wilkerson Pass, Bike-athon at Palmer and Colorado Springs, and severe weather.

WA0MNL, Rosie

DITS AND BITS

FOR SALE:

Drake TR-72 2 meter transceiver, 23 channels, crystal controlled with 7 crystals installed and power supply, an excellent 10 watt rig for packet.

Cobra telephone answering system with vcr and ~~intercom~~.

Heathkit SB630 station console, 2 SWR bridges.

Contact George, WB0DUM at 495-3983 for information.

FOR SALE:

Drake R4-B and T4-B with power supply and speaker, \$350.

Ten Tec Tritan 4 80-10 meter SSB rig with power supply, \$350.

15 element 430-440 MHz antenna, \$30.

7 element 430-440 DB Products commercial grade antenna, \$25.

Contact Rick Brown, KD0SU for information.

Bruce Draper is looking for help to return to the world of amateur radio. He lives in Widefield and can be reached at 390-0732.

FOR SALE:

Estate Sale! One transceiver, amplifier, tubes, power supply, meters, transformers, and misc.

WA6KYJ-636-2039

Anyone with an owners manual and/or schematic for a DSI 3550 Frequency counter please call Will, N0HRD 471-8527.

WANTED: Manual for CDR 45II and Cushman A-3 antenna. Al N0CMW 473-1660

FOR SALE:

Rova-Pro Cordless Phone (not working) \$10

AM/FM, Clock, Telephone w/ amplified speaker, snooze, etc \$20

Archer printed circuit board kits (2) \$5 ea.

(2) 10 meter vertical antennas \$10 ea

2-position coax switch (MFJ) \$15

High Voltage mica caps (Doorknob type)

Various panel meters

Large quantity of tubes tx and rx types some new some used (I have tester)

Heathkit SP-99 speaker \$15

ICOM HM-12 Hand Microphone \$20

100 KC Xtal Oscillator (9VDC) \$5

5V 1.2 amp DC supply \$5

Other parts and "stuff" too numerous to mention.

Ron-NK0P 593-8352 (H) 579-5274 (W)

ELEMENT SETS....

Here are new element sets for amateur satellites.

Name: MIR, ID: 16609, Epoch: 90222.69525653,
Incl: 51.6160, RAAN: 55.3008, Ecc: .0010484,
ARGP: 248.4867, Me An: 111.4743, M Mot:
15.64232197, Drag: .00014390, Orbit: 256622.

Name: OSCAR 13, ID: 19216, Epoch:
90219.75416427, Incl: 56.9602, RAAN: 141.9615,
Ecc: .7004620, ARGP: 233.0585, MEAN: 40.6721,
M MOT: 2.09702687, DRAG: .000099999, ORBIT:
16481.

NAME: OSCAR 14, ID: 20437, EPOCH:
90222.87402169, INCL: 98.6957, RAAN: 298.8192,
ECCE: .0011656, ARGP: 359.7757, MEAN: 0.3402,
M MOT: 14.28673998, DRAG: .00016111, ORBIT:
28671.

NAME: OSCAR 15, ID: 20438, EPOCH:
90223.04801342, INCL: 98.6997, RAAN: 298.9656,
ECCE: .0010568, ARGP: 358.5052, MEAN: 1.6100,
M MOT: 14.28403507, DRAG: .000060849, ORBIT:
28697.

NAME: OSCAR 16, ID: 20439, EPOCH:
90223.06993037, INCL: 98.7016, RAAN: 299.1464,
ECCE: .0011692, ARGP: 0.8834, MEAN: 359.2365,
M MOT: 14.28776153, DRAG: .000072935, ORBIT:
28701.

NAME: OSCAR 17, ID: 20440, EPOCH:
90223.06420679, INCL: 98.7015, RAAN: 299.1540,
ECCE: .0011885, ARGP: 0.9028, MEAN: 359.2172,
M MOT: 14.28824969, DRAG: .00011696, ORBIT:
28703.

NAME: OSCAR 18, ID: 20441, EPOCH:
90223.04967162, INCL: 98.7012, RAAN: 299.1650,
ECCE: .0012252, ARGP: 1.4710, MEAN: 358.6510,
M MOT: 14.28918748, DRAG: .00010348, ORBIT:
28704.

NAME: OSCAR 19, ID: 20442, EPOCH:
90223.04003960, INCL: 98.7013, RAAN: 299.1777,
ECCE: .0012697, ARGP: 1.0714, MEAN: 359.0493,
M MOT: 14.28988449, DRAG: .00011174, ORBIT:
28709.

NAME: RS 10/RS11, ID: 18129, EPOCH:
90221.83784878, INCL: 82.9270, RAAN: 288.8930,
ECCE: .0011232, ARGP: 337.6596, MEAN: 22.4054,
M MOT: 13.72101557, DRAG: .00012157, ORBIT:
156806.

73's...Rick, WB7THT

CLASSICAL ORBITAL ELEMENTS

by WB7THT

For the past few months I have been providing Ron with element sets for amateur radio satellites and I thought it might be helpful to describe how each one is related to a satellite orbit. The element sets I get come from the Space Surveillance Center (SSC) inside Cheyenne Mountain Air Force Base (CMAFB). The orbital analysts who work there are responsible for maintaining the catalog of artificial objects orbiting the Earth. Using an extensive network of sensors around the world, they assign a catalog number to each object and provide the initial orbital element sets soon after launch. The SSC also updates each object in the catalog on a periodic basis with the more important objects (Russian satellites for example) updated most frequently. The SSC is the source for element sets used by NASA and other agencies.

The first item in the element set is the name of the spacecraft. This name identifies the spacecraft and provides an easily recognizable term for day to day use. Examples include MIR, OSCAR 13, etc. Next in the list of elements is the vehicle ID number. For MIR, this number is 16609 and represents the object catalog number maintained by the SSC. When I ask for updated element sets from the SSC, I give the ID numbers of each satellite I need.

The EPOCH is a number representing time in year, day, and fraction of a day format. The element set describes the satellite orbit as predicted at the EPOCH time. The INCLINATION of an orbit, shown in the diagram as the letter i , is the angle between the K vector and the angular momentum vector h . That is a mathematical description. In layman's terms it is the angle between the equator and the satellite's orbital plane. As seen in the element set printed in this issue, the inclination of MIR is 51.6117 degrees. An interesting note about the inclination is that it also represents the northern and southern latitude limits of the orbit. In the case of MIR, the satellite orbit will extend to 51.6117 degrees north and south latitude, centered about the equator. The next element in the set is called the Right Ascension of the Ascending Node or RAAN for short. It is measured in the plane of the equator, from a universal reference point called the Vernal Equinox Direction to the point where the satellite crosses the equator in a northerly (ascending) direction. It is represented in the diagram as the Greek letter Λ .

ECCENTRICITY (e) is a measure of the shape of the orbit. As the eccentricity of the orbit approaches zero, the shape of the orbit becomes more circular. Again using MIR as an example, the orbital eccentricity is .0010123 or almost circular. As the eccentricity of the orbit approaches 1.0, the orbit becomes more elongated or elliptical in shape. This can be seen in the eccentricity of OSCAR 13's orbit of .6995680, representing an orbit ranging in height

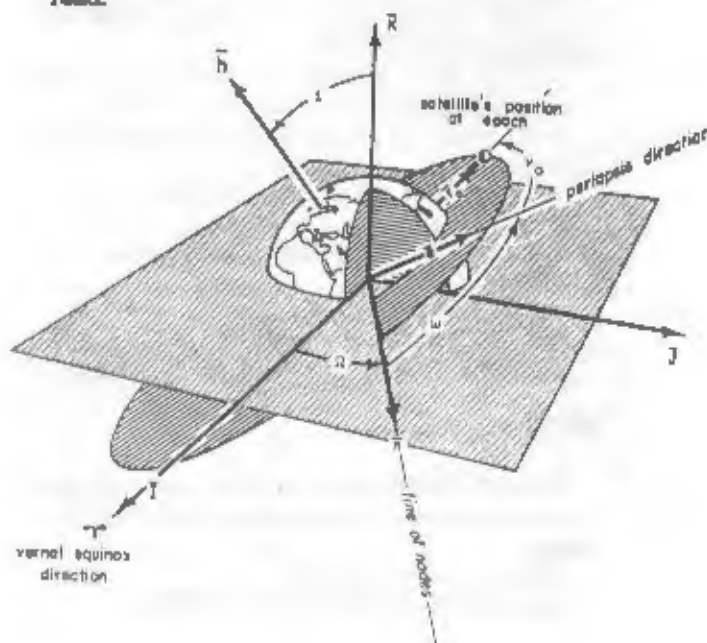
from approximately 1500 km at perigee to approximately 36,000 km at apogee.

The Argument of Perigee or ARGP is the angle, in the plane of the satellite's orbit, between the ascending node and periapsis direction or perigee (the lowest point in the satellite's orbit), measured in the direction of satellite motion. It is shown on the diagram as the Greek letter ω .

The Mean Anomaly or MEAN, is a term which describes the relationship between the passage of time and the size and shape of an orbit and satellite motion. It is measured from the perigee point and, when combined with the elapsed time since perigee passage, represents satellite position in the orbit. Mean Motion or M MOT, represents the velocity of the satellite in the orbit. It is measured in revolutions per day. Programs such as AMSAT's "QUIKTRAK" use Mean Motion and Mean Anomaly, to determine the position of a satellite at any given time.

The term DRAG, represents an approximation of the forces acting on the spacecraft to change or perturbate the predicted position. These forces include atmospheric drag, solar radiation pressure and small variations in the Earth's gravitational field. The DRAG term provided by the SSC includes the best possible estimate of these forces. The size and shape of the Earth's atmosphere is an extremely dynamic function, and as such is very difficult to model. Research is continuing in this area, but the numbers provided by the SSC represent the best possible calculated "guess". Last but not least, is the orbit number, ORBIT. This number represents the number of orbits the spacecraft has completed since it was first cataloged at the SSC.

The mathematics used in predicting orbital position are extremely complicated. These brief descriptions are an attempt to provide a layman's description for the amateur user. Give me a call if you would like more detailed information or a list of references to read.



GENERAL MEETING JULY 1990

The meeting was started by President RICK WB7THT at 1900 local by introduction of each member and guest.

Minutes approved as printed in 0 BEAT.

Treasurer report as follows:

Previous \$2929.46

Income \$243.39

Expenses \$353.77

Balance \$2819.09

COMMITTEE REPORTS:

RFI JEFF N0JLH 591-6438 NILL

EDUCATION BUD N0DDF 475-0537, Novice classes Sept. or Oct.

D&B SCHOOL BUD N0AA 698-2963 School still on vacation

PUBLIC SERVICE MIKE K0TER 636-1290, Thanks to all who helped on state games, Bikeathon, and Volksmarch. Tripoli Rocket Launch August 17, 18, 19. Mental Health bike 18 Aug 7 to 12.

Mike W9MHL thanks all for Pikes Peak Hill Climb, and reminder of fall Teller County Hill Climb.

Malcom KE9S Thanks those on hill climb also. Date of Teller Hill Climb Sept. 8&9.

VETERATING MAX ED0HL 488-9235 Hamman Sept 8th.

0 BEAT RON NK0P 593-8352 NEED A REPLACEMENT EDITOR.

PICNIC HARV WB0YXD Had a very nice picnic, should have done better advertisement for a better turnout.

Rick WB7THT read a appreciation letter from the Elks Lodge.

Lauren KX00 gave report on committee meeting on tower ordinance, goes to regulatory commission meeting on 31 Oct at 9am.

John N0KIC reported that there would be a simulated emergency exercises in September.

Budd N0AA is in process of checking hospital antennas.

DAVE N0ION ran his monthly raffle.

Prize winners:

N0LA ELECTRIC CORD.

BRYAN LIGHT.

WA6IZI DRIVER SET.

WA6YXD GATEWAY GIFT CERTIFICATE.

WB7EVR TICKET TO WAX MUSEUM.

PROGRAM:

BARRY N0GB Gave a nice talk and a demo of the search and rescue comm trailer, it was very interesting.

Meeting adjourned at 2130.

Submitted by AL N0CMW SEC PPRAA.

BOARD MEETING AUG 13th AT QTH OF RICK, WB7THT

Meeting called to order by President Rick at 1900.

Members present:

ROSIE W0MNL

RICK WB7THT

AL N0CMW

RUSS K0JFM

DAVE N0ION

FLOYD K0TCN

THE BOARD THANKED FLOYD FOR ALL HIS SUPPORT.

Hope he enjoys his new duty station in California.

The September program is set up to be on the hospital emergency antennas their locations, and what is needed by all who respond to one of the hospitals during an emergency.

Rick will get with Budd N0DDF ON NOVICE CLASSES.

Rick will get with Steve WB7VHR on trailer repair.

AL N0CMW resigned from board effective October elections.

ANYONE WHO WOULD LIKE TO RUN FOR BOARD OR ANY OFFICE PLEASE CONTACT ONE OF PRESENT BOARD MEMBERS.

Note just one more meeting prior to elections.

Club needs more good men and women to keep it running nicely as a special services club.

Next board meeting at the QTH of DAVE N0ION.

Dave let board know barring some unforeseen change his new job would preclude him for running for an office next year.

Meeting adjourned at 2030.

Submitted by AL N0CMW SEC PPRAA.

COLORADO AMATEUR CONNECTION

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KAOWIN—KBOEDL

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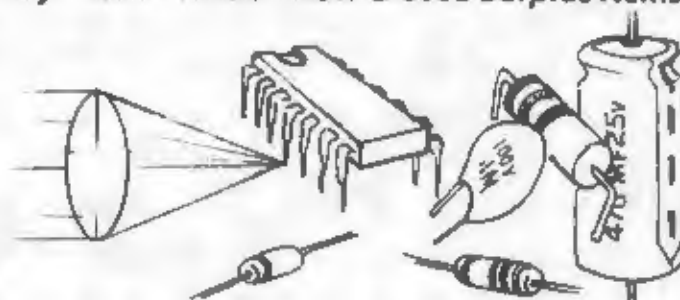
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M-F 9:30 - 5:30
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SEE SKIP OR ED

EL PASO COUNTY TOWER ORDINANCE

A MEETING WAS HELD ON FRIDAY
AUGUST 31ST AND THE TOWER OR-
DINANCE WAS REFERED TO THE PLAN-
NING COMMISSION WITH SOME VERY
FAVORABLE LANGUAGE FOR THE AM-
MATEUR COMMUNITY. HOWEVER, ONLY
THREE LOCAL AMATEURS SHOWED UP.
WE WERE VERY LUCKY THIS TIME.

THE NEXT STEP IS VERY IMPORTANT
AND WE MUST HAVE 50 TO 100 HAMS AT-
TEND THE PLANNING COMMISSION
MEETING ON SEPTEMBER 14TH. THIS WILL
BE HELD IN CENTENNIAL HALL
AUDITORIUM AT THE CORNER OF CAS-
CADE AND VERMILIO STREETS. (THE SAME
PLACE AS LAST YEARS MEETING)

KEEP LISTENING FOR UPDATED INFOR-
MATION AT THE PPRAA CLUB MEETING,
ON THE 37/97 REPEATER, OR ON 146.52
SIMPLEX.

FOR QUESTIONS CONTACT:

PETE LAFOSSE, N0LA 495-4820
LAUREN LIBBY, KX00 593-9861
HAL BERGESON, W0MXY 471-0238

Amateur Wordsearch

NOITALUDOM

Gene Lemons, N8ENC

N	A	M	A	T	E	U	R	C	A	S	T	L	O	V
R	G	E	N	E	R	A	L	N	B	T	E	C	H	M
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ADVANCED	MANUAL
AMATEUR	MODE
ANTENNA	NOVICE
BATTERY	NET
CASE	OHMS
CODE	PATTERN
ENJOYABLE	PRIORITY
EASY	RECEIVER
EXTRA	STATION
FREQUENCY	TUBES
FUN	TUNE
GENERAL	TECH
LICENSE	TOWER
MOBILE	VOLTS
MAINTENANCE	WAVE

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Colorado Springs, CO 80935

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Name _____

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• Family Membership \$18.00

• Newsletter Only \$10.00

Additional Names _____ Call _____ Class _____

Associate Member

☐ (Outside Teller & El Paso Counties.) ☐ RENEWAL ✓ HERE

PPRAA is not associated with the Pikes Peak FM Association.